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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/864,093	05/21/2001	Gerald R. Clark	70651	1812

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EXAMINER	
PHAN, HANH	

ART UNIT	PAPER NUMBER
2638	

DATE MAILED: 09/09/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/864,093	CLARK ET AL.	
	Examiner	Art Unit	
	Hanh Phan	2638	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *21 May 2001*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-50* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-8,10-18 and 20-50* is/are rejected.

7)☒ Claim(s) *9 and 19* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

1. This Office Action is responsive to the Amendment filed on 06/22/2005.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claims 1 and 12 are rejected under 35 U.S.C. 102(b) as being anticipated by Medved et al (US Patent No. 5,818,619).

Regarding claims 1 and 12, referring to figure 1, Medved discloses a method of communicating optical signals over a free-space link, comprising the steps of:

receiving (i.e., RXU 24, Fig. 1) a first optical signal having a fiber interface fundamental wavelength (i.e., interface unit 11, Fig. 1) from a first single mode optical fiber (14);

converting (i.e., RXU 24 and airlink transmitter 26 , Fig. 1) the fiber interface fundamental wavelength of the first optical signal to a free-space fundamental wavelength with a transmit wavelength transformer (i.e., RXU 24 and airlink transmitter 26, Fig. 1);

directing (i.e., airlink transmitter 26 and lens 27, Fig. 1) the first optical signal having the free-space fundamental wavelength over the free-space link;

receiving (i.e., airlink receiver 21, Fig. 1) a second optical signal having the free-space fundamental wavelength from the free-space link;

converting (i.e., airlink receiver 21 and TXU 20, Fig. 1) the free-space fundamental wavelength of the second optical signal to a fiber interface fundamental wavelength with a receive wavelength transformer (i.e., airlink receiver 21 and TXU 20, Fig. 1); and

directing (i.e., TXU 20, Fig. 1) the second optical signal having the fiber interface fundamental wavelength into a second single mode optical fiber (15)(col. 5, lines 14-46).

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. Claims 2-7, 10, 11, 13-17, 20 and 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Medved et al (US Patent No. 5,818,619) in view of Geiger (US Patent No. 5,377,219).

Regarding claims 2, 3, 13 and 14, Medved differs from claims 2, 3, 13 and 14 in that he fails to teach wherein the step of converting the fiber interface fundamental wavelength of the first optical signal to a free-space fundamental wavelength is performed all-optically without using electro-optical conversion. However, Geiger in US Patent No. 5,377,219 teaches the step of converting the fiber interface fundamental

wavelength of the first optical signal to a free-space fundamental wavelength is performed all-optically without using electro-optical conversion (Figs. 8 and 9, col. 12, lines 45-67, col. 13, lines 1-12 and lines 41-43). Therefore, it would have been obvious to one having skill in the art at the time the invention was made to incorporate the converting the fiber interface fundamental wavelength of the first optical signal to a free-space fundamental wavelength is performed all-optically without using electro-optical conversion as taught by Geiger in the system of Medved. One of ordinary skill in the art would have been motivated to do this since Geiger suggests in column 12, lines 45-67, col. 13, lines 1-12 and lines 41-43 that using such the converting the fiber interface fundamental wavelength of the first optical signal to a free-space fundamental wavelength is performed all-optically without using electro-optical conversion have advantage of allowing providing a mid-infrared wavelength using for communicating dada over a free space optical link to overcome the atmospheric conditions as fog and reducing space, weight and cost of the whole of the device.

Regarding claims 4 and 15, Medved further teaches wherein the step of converting the free-space fundamental wavelength of the second optical signal to a fiber interface fundamental wavelength is performed using optical-to-electrical conversion (Fig. 1).

Regarding claims 5, 6, 10, 11, 16, 17, 20 and 21, the combination of Medved and Geiger teaches sampling a portion of the second optical signal having the free-space fundamental wavelength and using the sampled portion of the second optical signal in an offline path to determine a new value for the free-space fundamental

wavelength and comparing a detected offline performance with a detected online performance (Figs. 4, 5, 8 and 9 of Geiger, col. 12, lines 45-67, col. 13, lines 1-12 and lines 41-43).

Regarding claim 7, the combination of Medved and Geiger teaches reconfiguring the transmit wavelength transformer to convert the fiber interface fundamental wavelength of the first optical signal to the new value for the free-space fundamental wavelength (Figs. 8 and 9 of Geiger, col. 12, lines 45-67, col. 13, lines 1-12 and lines 41-43).

6. Claims 8 and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Medved et al (US Patent No. 5,818,619) in view of Kumar et al (Pub No. US 2002/0075542).

Regarding claims 8 and 18, Medved differs from claims 8 and 18 in that he fails to teach receiving an indication of a new value for the free-space fundamental wavelength via an out-of-band communications channel. However, Kumar teaches receiving an indication of a new value for the free-space fundamental wavelength via an out-of-band communications channel (Fig. 8, paragraphs [0053] and [0054]). Therefore, it would have been obvious to one having skill in the art at the time the invention was made to incorporate the receiving an indication of a new value for the free-space fundamental wavelength via an out-of-band communications channel as taught by Kumar in the system of Medved. One of ordinary skill in the art would have been motivated to do this since Kumra suggests in paragraphs [0053] and [0054] that using

such the receiving an indication of a new value for the free-space fundamental wavelength via an out-of-band communications channel have advantage of allowing changing the capacity of the wireless link in response to changing environmental conditions.

7. Claims 22, 28, 29, 34, 35, 42, 43 and 50 are rejected under 35 U.S.C. 103(a) as being unpatentable over Medved et al (US Patent No. 5,818,619) in view of Ransford et al (US Patent No. 6,532,087).

Regarding claims 22, 29, 35 and 43, referring to figure 1, Medved discloses a method of communicating optical signals over a free-space link, comprising the steps of:

receiving (i.e., RXU 24, Fig. 10 a first optical signal having a fiber interface fundamental wavelength from a first single mode optical fiber;

converting (i.e., RXU 24 and airlink transmitter 26 , Fig. 1) the fiber interface fundamental wavelength of the first optical signal to a free-space fundamental wavelength with a transmit wavelength transformer; and

directing (i.e., airlink transmitter 26 and lens 27, Fig. 1) the first optical signal having the free-space fundamental wavelength over the free-space link (col. 5, lines 14-46).

Medved differs from claims 22, 29, 35 and 43 in that he fails to teach amplifying the first optical signal with a multi-wavelength optical amplifier connected in-line with the first single mode optical fiber and attenuating the first optical signal with a variable optical attenuator that is optically coupled to the multi-wavelength optical amplifier.

However, Ransford in US Patent No. 6,532,087 teaches amplifying an optical signal with a multi-wavelength optical amplifier (i.e., optical amplifier 20, Fig. 2) connected in-line with an single mode optical fiber and attenuating the optical signal with a variable optical attenuator (i.e., variable optical attenuator 10, Fig. 2) that is optically coupled to the multi-wavelength optical amplifier (col. 5, lines 57-67). Therefore, it would have been obvious to one having skill in the art at the time the invention was made to incorporate the amplifying an optical signal with a multi-wavelength optical amplifier connected in-line with an single mode optical fiber and attenuating the optical signal with a variable optical attenuator that is optically coupled to the multi-wavelength optical amplifier as taught by Ransford in the system of Medved. One of ordinary skill in the art would have been motivated to do this since Ransford suggests in column 5, lines 57-67 that using such the amplifying an optical signal with a multi-wavelength optical amplifier connected in-line with an single mode optical fiber and attenuating the optical signal with a variable optical attenuator that is optically coupled to the multi-wavelength optical amplifier have advantage of allowing increasing the power level of the signal and keeping the power level of signal at a desired power level.

Regarding claims 28, 34, 42 and 50, the combination of Medved and Ransford teaches controlling a power gain of the multi-wavelength optical amplifier and a dynamic attenuation provided by the variable optical attenuator (Fig. 2 of Ransford, col. 8, lines 16-26).

8. Claims 23-25, 30-32, 36-39, 44-47 and 49 are rejected under 35 U.S.C. 103(a) as being unpatentable over Medved et al (US Patent No. 5,818,619) in view of Ransford et al (US Patent No. 6,532,087) and further in view of Geiger (US Patent No. 5,377,219).

Regarding claims 23, 30, 36 and 44 Medved as modified by Ransford differs from claims 23, 30, 36 and 44 in that he fails to teach wherein the step of converting the fiber interface fundamental wavelength of the first optical signal to a free-space fundamental wavelength is performed all-optically without using electro-optical conversion. However, Geiger in US Patent No. 5,377,219 teaches the step of converting the fiber interface fundamental wavelength of the first optical signal to a free-space fundamental wavelength is performed all-optically without using electro-optical conversion (Figs. 8 and 9, col. 12, lines 45-67, col. 13, lines 1-12 and lines 41-43). Therefore, it would have been obvious to one having skill in the art at the time the invention was made to incorporate the converting the fiber interface fundamental wavelength of the first optical signal to a free-space fundamental wavelength is performed all-optically without using electro-optical conversion as taught by Geiger in the system of Medved modified by Ransford. One of ordinary skill in the art would have been motivated to do this since Geiger suggests in column 12, lines 45-67, col. 13, lines 1-12 and lines 41-43 that using such the converting the fiber interface fundamental wavelength of the first optical signal to a free-space fundamental wavelength is performed all-optically without using electro-optical conversion have advantage of allowing providing a mid-infrared wavelength using for communicating dada over a free space optical link to overcome the

atmospheric conditions as fog and reducing space, weight and cost of the whole of the device.

Regarding claims 24, 25, 31, 32, 38, 39, 46, 47 and 49 the combination of Medved, Ransford and Geiger teaches reconfiguring the transmit wavelength transformer to convert the fiber interface fundamental wavelength of the first optical signal to the new value for the free-space fundamental wavelength (Figs. 4, 5, 8 and 9 of Geiger, col. 12, lines 45-67, col. 13, lines 1-12 and lines 41-43).

Regarding claims 37 and 45, Medved further teaches wherein the step of converting the free-space fundamental wavelength of the second optical signal to a fiber interface fundamental wavelength is performed using optical-to-electrical conversion (Fig. 1).

9. Claims 26, 27, 33, 40, 41 and 48 are rejected under 35 U.S.C. 103(a) as being unpatentable over Medved et al (US Patent No. 5,818,619) and Ransford et al (US Patent No. 6,532,087) in view of Geiger (US Patent No. 5,377,219) and further in view of Kumar et al (Pub No. US 2002/0075542).

Regarding claims 26, 33, 40 and 48 the combination of Medved, Ransford and Geiger differs from claims 26, 33, 40 and 48 in that it fails to teach receiving an indication of a new value for the free-space fundamental wavelength via an out-of-band communications channel. However, Kumar teaches receiving an indication of a new value for the free-space fundamental wavelength via an out-of-band communications channel (Fig. 8, paragraphs [0053] and [0054]). Therefore, it would have been obvious

to one having skill in the art at the time the invention was made to incorporate the receiving an indication of a new value for the free-space fundamental wavelength via an out-of-band communications channel as taught by Kumar in the system of the combination of Medved, Ransford and Geiger. One of ordinary skill in the art would have been motivated to do this since Kumra suggests in paragraphs [0053] and [0054] that using such the receiving an indication of a new value for the free-space fundamental wavelength via an out-of-band communications channel have advantage of allowing changing the capacity of the wireless link in response to changing environmental conditions.

Regarding claims 27 and 41, the combination of Medved, Ransford, Geiger and Kumar teaches sampling a portion of the first optical signal having the free-space fundamental wavelength, receiving a second optical signal having the free-space fundamental wavelength from the free-space link, sampling a portion of the second optical signal having the free-space fundamental wavelength, and comparing a wavelength of the sampled portion of the first optical signal to a wavelength of the sampled portion of the second optical signal to determine the new value for the free-space fundamental wavelength (Figs. 4, 5, 8 and 9 of Geiger, col. 12, lines 45-67, col. 13, lines 1-12 and lines 41-43).

Allowable Subject Matter

10. Claims 9 and 19 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Response to Arguments

11. Applicant's arguments filed 06/22/2005 have been fully considered but they are not persuasive.

The applicant's arguments to claims 1-8, 10-18 and 20-50 are not persuasive. The independent claims 1 and 12 include the limitations of "**converting the fiber interface fundamental wavelength of the first optical signal to a free-space fundamental wavelength with a transmit wavelength transformer; and converting the free-space fundamental wavelength of the second optical signal to a fiber interface fundamental wavelength with a receive wavelength transformer**" and the applicant argues that the cited reference (Medved et al) fails to teach such the limitations. The examiner respectfully disagrees. As indicated in Figure 1, Medved clearly teaches a universal converter unit 10 converting a first wavelength received from the fiber optic transmitter 12 to a free space wavelength by airlink transmitter 26, and also the universal converter unit 10 converting a free space wavelength received from airlink receiver 21 to a second wavelength received by a fiber optic receiver 13 (col. 1, lines 65-67, col. 2, lines 1-22, col. 4, lines 32-57 and col. 5, lines 14-46).

Therefore, it is believed that the limitations of claims 1-8, 10-18 and 20-50 are still met by the combination of Medved, Geiger, Kumar and Ransford, and the the rejection is still maintained.

Conclusion

12. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

13. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Hanh Phan whose telephone number is (571)272-3035.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kenneth Vanderpuye, can be reached on (571)272-3078. The fax phone number for the organization where this application or proceeding is assigned is (571)273-8300.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703)305-4700.

HANH PHAN
PRIMARY EXAMINER

Title: FREE-SPACE OPTICAL COMMUNICATION SYSTEM EMPLOYING WAVELENGTH CONVERSION
Inventor: Clark et al.
Application No.: 09/864,093 Attorney Docket No.: 70651/7293
REPLACEMENT SHEET

Approved HP 09/21/05

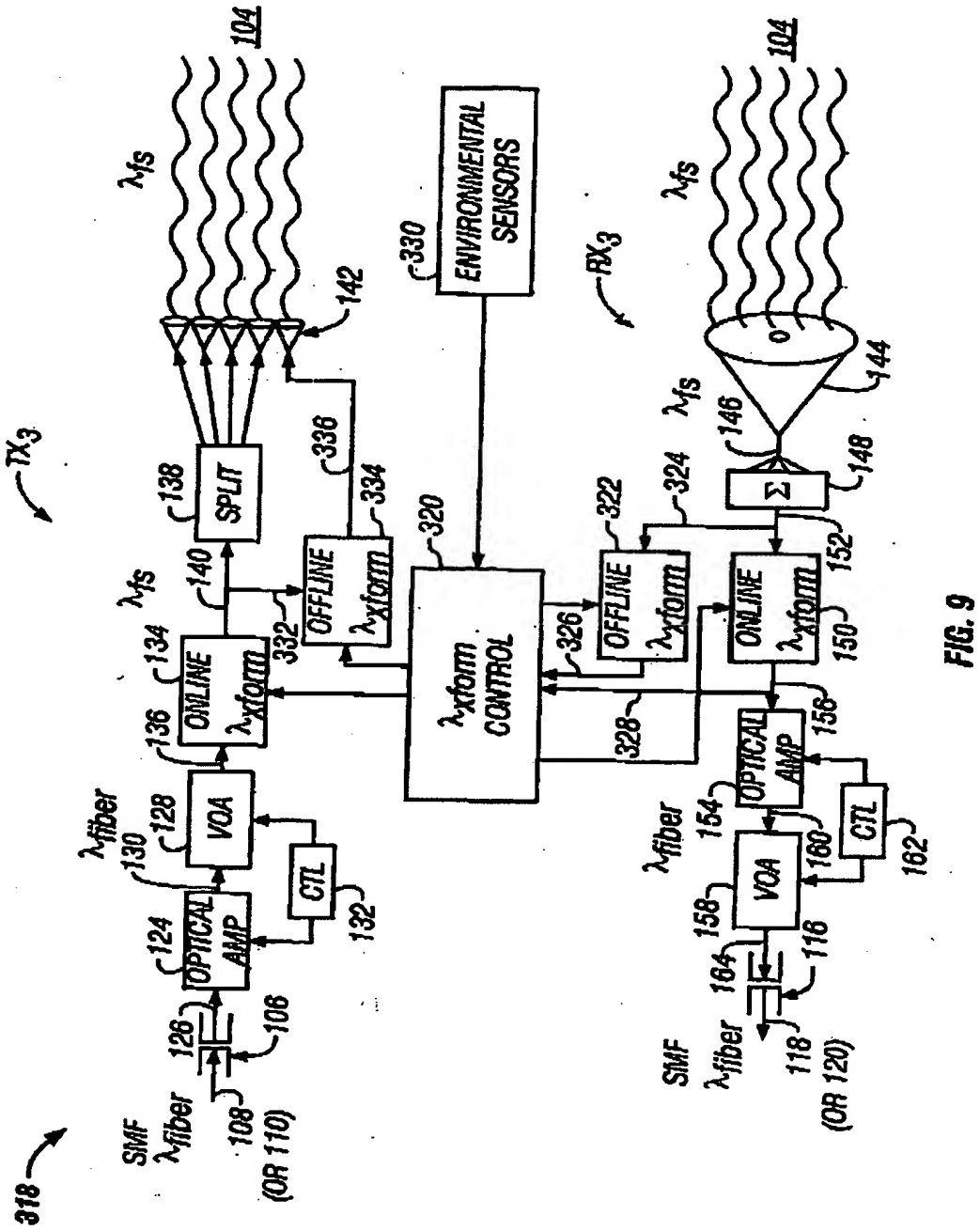

FIG. 9